DOCUMENT RESUME

ED 197 145 CE 027 773

AUTHOR Schramm, C.; Osland, Walt
TITLE Mountain Plains Learning Experience Guide: Automotive Repair. Course: Emission Systems.
INSTITUTION Mountain-Plains Education and Economic Development Program, Inc., Glasgow AFB, Mont.
SPONS AGENCY Office of Vocational and Adult Education (ED), Washington, D.C.
BUREAU NO 499MH90008
PUB DATE Mar 76
CONTRACT 300-79-0153
NOTE 101p.; Some pages may not reproduce well due to light print. For related documents, see CE 027 766, CE 027 768-775, CE 027 777-780.

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS Adult Education; Air Pollution; *Auto Mechanics; Disadvantaged; Family Programs; *Individualized Instruction; Instructional Materials; Learning Activities; Learning Modules; Motor Vehicles; Postsecondary Education; Skilled Occupations; *Vocational Education
IDENTIFIERS *Emission Control; *Emissions; Mountain Plains Program

ABSTRACT

One of twelve individualized courses included in an automotive repair curriculum, this course covers the theory, testing, and servicing of automotive emission control systems. The course is comprised of one unit, Fundamentals of Emission Systems. The unit begins with a Unit Learning Experience Guide that gives directions for unit completion. The remainder of the unit consists of Learning Activity Packages (LAP) that provide specific information for completion of a learning activity. Each LAP is comprised of the following parts: objective, evaluation procedure, resources, procedure, supplemental sheets, study guide, and a LAP test with answers. The course is preceded by a pretest which is designed to direct the student to units and performance activities. (LRA)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED197145

MOUNTAIN PLAINS LEARNING EXPERIENCE GUIDE:

Automotive Repair.

Course: Emission Systems.

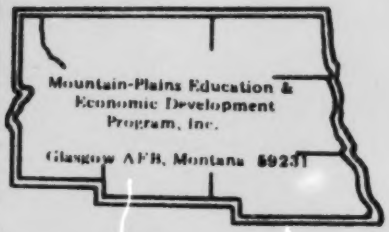
CE027773

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

File Code: 37.06.00.00.B1-1

Date Published: 3/5/76



Learning Experience Guide

COURSE: EMISSION SYSTEMS

DESCRIPTION:

Emission Systems covers the theory, testing and servicing of automotive emission control systems.

RATIONALE:

The theory and techniques covered in this course will enable you to test and service automotive emission control systems.

PREREQUISITES:

37.05.00.00. Automotive Fuel Systems

OBJECTIVE:

Test and service automotive emission control systems.

RESOURCES:

A course resource list is attached.

GENERAL INSTRUCTIONS:

This course has one unit. The unit has a Unit Learning Experience Guide (LEG) that gives directions for unit completion. The unit consists of Learning Activity Packages (LAPs) that provide specific information for completion of a learning activity. Pretesting results direct the student to units and performance activities.

The general procedure for this course is as follows:

1. Read the assigned unit LEG for this course.
2. Begin and complete the first assigned LAP.
   a. Take and score the LAP test.
   b. Turn in the LAP test answer sheet.
   c. Determine the reason for any missed items on the LAP test.
   d. Proceed to the next assigned LAP in the unit.
   e. Complete all required LAPs for the unit by following steps (a) through (d).
3. Take the unit test as described in the Unit LEG "Evaluation Procedures".
4. Proceed to the next assigned unit in this course.

Principal Author(s): C. Schramm/W. Osland

5. Proceed to the next assigned course.

You will work independently unless directed to do otherwise. When questions or problems arise, you are expected to discuss them with the instructor. At all times remember to follow correct safety procedures during the performance activity.

UNIT TITLE:

.01 Fundamentals of Emission Systems

EVALUATION PROCEDURE:

Course evaluation is by pre and post testing using a multiple-choice type of test.

In this course, the course test is used as a pretest to determine if the student may be able to validate the unit. The student is considered validated for the unit if 4 out of 5 items are correctly answered for each LAP part on the course pretest and if the student also satisfactorily completes the performance tests for the unit. Unit performance test validation procedures are given in the "Evaluation Procedure" section of the unit Learning Experience Guide (LEG).

The course test will also be taken by the student as a post test to determine any changes resulting from taking all or part of the course.

FOLLOW-THROUGH:

Go to the first Unit Learning Experience Guide (LEG) listed on your Student Progress Record (SPR).

RESOURCE LIST

Printed Materials

1. Auto Mechanics Fundamentals, Stockel, Goodheart-Willcox Company Inc., 1969.
2. Auto Repair Manual, 1972 or equivalent.
3. Auto Service and Repair, Stockel, Goodheart-Willcox Company, Inc., 1969.
4. National Service Data, Mitchell Manuals, Inc.

Audio/Visuals

none

Equipment

1. Automobile equipped with:
   - air pump and check valve
   - air injection
   - anti-afterburn valve
   - emmission control system
     - Chrysler
     - Ford
     - General Motors
2. Automobile needing:
   - PCV valve inspection and service
   - exhaust efficiency test
3. Replacement parts:
   - exhaust system.
4. Tools, basic hand:
   - chisel and punch set
     - 5/32" pin punch
     - 3/16" solid
   - guage, feeler (.002" - .025")
   - hammer, ball peen
   - hammer, plastic tip
   - handle, speed
   - hex key set
   - pliers, diagonal cutting
   - pliers, needle nose
   - scraper, gasket
   - screwdriver, standard (set)
   - screwdriver, Phillips (set)
   - screw starter
   - socket set (3/8" drive)
     - extension (3")
     - handle (6" flex)
     - ratchet
   - socket, spark plug
     - extension (6")
   - wrench, combination (set)
   - wrench, combination ignition (set)
5. Tools, general:
   - compressed air
   - fender cover
6. Tools, exhaust system:
   - exhaust analyzer

Student: _____ File Code: 37.06.00.00.B1-2

Date: _____ Date Published: 3/9/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

COURSE TEST: EMISSION SYSTEMS

37.06.01.01

1. On an air injection system you have an air pump drawing fresh air (through the filter) which is operated by:

   a. the carburetor.
   b. a gear system.
   c. a cam system.
   d. the engine and belt systems.

2. By connecting a hose between the engine interior and the intake manifold, engine vacuum will draw the carnk case fumes out of the engine and into the cylinder where the gases will be burned along with the regular fuel charge. This is known as:

   a. hydrocarbon exhaust fuel flow.
   b. disposing of waste materials.
   c. negative crank case ventilation.
   d. positive crank case ventilation.

3. It is important to provide adequate ventilation to systems to prevent:

   a. backfiring.
   b. moisture, hot gases, and excessive pressure build-up.
   c. air pollution.
   d. hydrocarbon emission.

4. A poisonous gas which is in exhaust fumes is:

   a. sulfur dioxide.
   b. carbon dioxide.
   c. hydrogen oxide.
   d. carbon monoxide.

5. Water, nitrogen, hydrogen, carbon dioxide and carbon monoxide make about what percent of the exhaust from the average car engine?

   a. 75%
   b. 40%
   c. 80%
   d. 99.9%

37.06.01.02

6. A clogged PCV system will result in:

   a. no gas coming to the carburetor.
   b. erratic idle speed.
   c. a fast idle.
   d. smooth acceleration but stumbling occurs on deceleration.

37.06.01.02 (continued)

7. You would clean out the metering orifice in a PCV system by:

   a. using a drill bit.
   b. using a clean rag.
   c. using air.
   d. washing in solvent and blowing dry.

37.06.01.03

8. By retarding the spark on a Ford IMCO unit you can:

   a. reduce emission from the exhaust.
   b. increase emission from the exhaust.
   c. reduce emission from the intake manifold.
   d. increase emission from the intake manifold.

9. The Ford Thermactor emission system distributes fresh air from the air pump to the:

   a. vacuum advance on the distributor.
   b. manifold vacuum connection.
   c. individual exhaust ports.
   d. intake manifold.

10. The Ford IMCO exhaust emission control system is designed to:

   a. reduce the amount of carbon monoxide and hydrocarbons formed in the engine.
   b. reduce the amount of heptane and isooctane formed in the engine.
   c. reduce the amount of distillation in an engine.
   d. reduce the volatility of the fuel.

11. A Ford IMCO carburetor idle screws equipped with limiters:

   a. decrease the amount of isooctane and heptane in the fuel lines.
   b. lower the viscosity of fuel in the lines.
   c. increase the amount of carbon in the carburetor.
   d. promote a more complete combustion of the air-fuel mixture.

12. Ford engineers feel that the location that most effectively mixes exhaust gases and air for effective burning of hydrocarbons is:

   a. the air horn on the carburetor.
   b. the exhaust port near the exhaust valve seat.
   c. the intake manifold.
   d. the air cleaner.

37.06.01.04

13. In the Ford IMCO system, the distributor vacuum control valve has the function of lowering engine temperature. It is exposed to the cooling system, and when coolant temperature exceeds normal limits during long idle periods, the valve opens a vacuum passage to the advance diaphragm of the distributor which:

    a. brings in outside air.
    b. speeds up the engine.
    c. brings in hot air from the exhaust.
    d. shuts the fan off.

14. The Ford IMCO system has a two diaphragm vacuum advance unit on the distributors; these units use one diaphragm to retard the spark timing under what conditions?

    a. open throttle conditions.
    b. hot weather conditions.
    c. cold weather conditions.
    d. closed throttle conditions.

15. Some Ford Emission systems incorporate a vacuum override motor which has the function of providing additional air to the carburetor during:

    a. cold deceleration.
    b. hot acceleration.
    c. hot deceleration.
    d. cold acceleration.

16. On an Auto Therm Air Cleaner System, when you first start your engine, air is drawn from:

    a. the shroud at the exhaust manifold.
    b. the engine compartment.
    c. outside of the car.
    d. the intake manifold.

17. In the Forc Exhaust Gas Recirculation system, the mixture of intake gases is diluted, thus lowering peak flame temperatures during combusion and limiting the formation of:

    a. warm air entering the carburetor.
    b. advanced spark.
    c. gas circulation or flow.
    d. nitrogen oxides (NOx).

37.06.01.05

18. One type of emissions device used only by Chrysler is the:

    a. air pump.
    b. EGR.
    c. floor jet.
    d. PCV valve.

37.06.01.05 (continued)

19. One type of system used by Chrysler Corporation cars is called:

    a. cleaner air package.
    b. air guard system.
    c. thermactor system.
    d. IMCO

20. On a dual exhaust on a Chrysler engine when checking the air-fuel ratio you would insert exhaust sample pick-up tube where?

    a. left tail pipe.
    b. right tail pipe.
    c. both tail pipes.
    d. on the exhaust manifold.

21. With Chrysler engine at normal operating temperature and carburetor air cleaner in place, automatic transmission in neutral, and air conditioning off, you would adjust and set:

    a. the dashpot adjustment.
    b. fast idle speed and ignition timing.
    c. slow idle speed and ignition timing.
    d. vacuum advance control valve.

22. The Chrysler system is mainly designed to most effectively cut down emission exhaust during:

    a. speeds of 30 to 60.
    b. acceleration.
    c. deceleration.
    d. speeds of 60 to 80.

37.06.01.06

23. In the Chrysler air injection emission system, fresh air is pumped into the exhaust valves to:

    a. insure a steady amount of clean air to distributor.
    b. increase engine horsepower.
    c. prevent flooding when starting.
    d. burn the unburned portion of exhaust gases.

24. The Chrysler Cleaner Air Package is engineered to continuously control carburetion and ignition at the best settings for performance and combustion during:

    a. normal driving conditions.
    b. all driving conditions.
    c. low temperature driving conditions.
    d. high temperature driving conditions.

37.06.01.06

25. The Chrysler Cleaner Air System employs higher inlet air temperature, higher idle speeds, retarded ignition timing, leaner carburetor mixtures and lower compression to:

    a. increase the horsepower of the engine.
    b. reduce exhaust emissions.
    c. increase the fuel input into the carburetor.
    d. increase the fuel mileage.

26. The Chrysler Orifice Spark Advance control is used in the control of oxides of nitrogen. The system controls the:

    a. compression of the pistons.
    b. vacuum advance to the distributor instantaneously.
    c. temperature of the coolant system.
    d. vacuum advance activator of the distributor.

27. In the Chrysler Exhaust Gas Recirculation System (EGR), exhaust gases are circulated to:

    a. retard the vacuum advance system.
    b. warm up the engine exhaust system.
    c. activate the vacuum advance system.
    d. dilute the incoming fuel-air mixture.

37.06.01.07

28. General Motors emission systems have a:

    a. controlled combusion system.
    b. Thermactor System.
    c. Air Guard System.
    d. Engine Mod System.

29. A valve, on General Motors emission systems, which is incorporated in the system to prevent backfire during the deceleration is the:

    a. check valve.
    b. diverter valve.
    c. pressure relief valve.
    d. crank case vent valve.

30. On a General Motors emission system a valve is located in the discharge cavity of the air pump or in the diverter valve. Its function is to allow pumping outlet air to bypass air injection system at high engine speeds and loads. This valve is called the:

    a. exhaust valve.
    b. pressure relief valve.
    c. check valve.
    d. diverter valve.

37.06.01.07 (continued)

31. The valves in a General Motors emission system which are located on air manifolds to prevent back flow of exhaust gases into air injection lines are called the:

    a. pressure relief valves.
    b. check valves.
    c. diverter valves.
    d. exhaust valves.

32. The General Motors emission system with air injection should not interchange which parts, with a car without air injection?

    a. carburetors and air cleaners.
    b. carburetors and valves.
    c. carburetors and distributors.
    d. carburetors and exhaust manifolds.

37.06.01.08

33. The combined Emission Control system on a GM System is designed to provide vacuum spark advance during:

    a. high gear deceleration.
    b. low gear operation.
    c. idling.
    d. high gear operation.

34. To test the Transmission Controller Spark Solenoid, you disconnect the hoses and electrical connector, connect hose to distributor vacuum port and blow into it. Air should come out of the vacuum port that was connected to the vacuum source. You then connect a jumper from one terminal to ground and connect the other terminal to a 12 volt source. What should happen?

    a. the distributor vacuum advance should advance 5 degrees.
    b. a click should be heard and air should suck into the vent port.
    c. the distributor vacuum advance should retard 5 degrees.
    d. a click should be heard and air should come out of the vent port.

35. What is the purpose of the pressure control valve placed between the valve cover and the manifold in the crank case ventilating system?

    a. to provide extra air for idling.
    b. to prevent excess air flow during idling.
    c. to retard the spark.
    d. to decrease air flow when engine speed increases.

36. To test the GM (S.C.S.) system you raise the rear wheels, start the engine and accelerate it while watching the timing works on the harmonic balancer. When the car speed exceeds 39 mph, the timing should:

    a. advance.
    b. retard no more than 5 degrees.
    c. stay the same.
    d. retard 10 degrees.

37.06.01.08 (continued)

37. On a General Motors Exhaust Gas Recirculation system (EGR), the exhaust gases are induced into the:

a. intake manifold at throttle positions other than idle.
b. distributor vacuum diaphragm.
c. exhaust manifold.
d. carburetor during normal operating speeds.

37.06.01.09

38. The exhaust emission air pump is activated by:

a. the V-belt
b. the camshaft.
c. the crankshaft.
d. the pistons.

39. In checking the air pump, which two things are most important to check?

a. belt tension and air temperature
b. belt tension and air pressure from pump.
c. air pressure into pump and from pump.
d. belt tension and air pressure into pump.

40. When you install a new centrifugal filter fan, you do so by:

a. tapping it on evenly using a hammer.
b. pressing it on with a jack.
c. heating the filter fan so it will slip over the rotor shaft.
d. drawing evenly by alternating torquing pulley bolts.

37.06.01.10

41. To remove carbon build-up from an air injection tube you would:

a. use a drill bit.
b. use a wire brush.
c. use penetrating oil.
d. let set in cleaning solvent for a day and then blow off carbon with air.

42. How do injection tubes fit into the exhaust manifold?

a. slip in
b. welded in
c. tapped in
d. pressed in

37.06.01.11

43. The function of a check valve is to:

a. allow passage of air toward the exhaust manifold while preventing any return flow.
b. allow exhaust gas to enter the air pump to dilute the air/fuel mixture.
c. check air pressure.
d. [illegible] relief valve for safety

37.06.01.12

44. When an anti-afterburn valve is not functioning, you:

a. replace it.
b. take it apart and clean by blowing air through it.
c. take it apart and clean it in solvent.
d. bypass it by hooking hoses together.

45. To check the anti-afterburn valve you disconnect the valve inlet hose from valve and race the engine rapidly. The moment accelerator is released, air should be sucked into valve. How long can air be sucked into the valve before it should be replaced?

a. 5 seconds.
b. 20 seconds.
c. 10 seconds.
d. 1 second.

37.06.01.13

46. When you have a dual exhaust and are checking the combustion efficiency on an emission system, it is important to:

a. put the analyzer in the left tail pipe.
b. put the analyzer in both tail pipes.
c. plug one tail pipe when hooking the analyzer to the exhaust manifold.
d. disconnect the vacuum advance on the carburetor

47. When hooking up the combustion analyzer when testing the combustion efficiency on an emission system, the analyzer's probe should be how far in the hook-up?

a. 2 "
b. ½"
c. 18 "
d. 6 "

48. When testing combustion efficiency in an emission system, you would hook your analyzer:

a. in the intake manifold.
b. in the exhaust manifold.
c. in the exhaust pipe.
d. in the fuel outlet on the carburetor.

49.

37.06.01.13 (continued)

50. In order to take a combustion effiency check, you must have the engine and analyzer at what temperature?

a. hot operating temperature.
b. cold operating temperature.
c. normal operating temperature.
d. it doesn't make any difference.

COURSE PRETEST ANSWER KEY: EMISSION SYSTEMS

Occupational Area: _____
File Code: 37.06.00.00.B1-2
Name: Emission Systems
Family Pay Number _____ Sex M F (Circle 1)

ANSWERS

37.06.01.01
1. A _____
2. A _____
3. D _____
4. D _____
5. B _____

37.06.01.02
6. C _____
7. A _____

37.06.01.03
8. A _____
9. D _____
10. A _____
11. C _____
12. D _____

37.06.01.04
13. A _____
14. D _____
15. D _____
16. B _____
17. D _____

37.06.01.05
18. A _____
19. C _____
20. C _____

37.06.01.05
21. A _____
22. C _____

37.06.01.06
23. C _____
24. A _____
25. B _____
26. D _____
27. D _____

37.06.01.07
28. A _____
29. C _____
30. C _____
31. C _____
32. B _____

37.06.01.08
33. D _____
34. C _____
35. D _____
36. D _____
37. B _____

37.06.01.09
38. A _____
39. C _____
40. D _____

37.06.01.10
41. C _____
42. C _____

37.06.01.11
43. C _____

37.06.01.12
44. C _____
45. D _____

37.06.01.13
46. A _____
47. D _____
48. C _____
49. _____
50. C _____
51. _____
52. _____
53. _____
54. _____
55. _____
56. _____
57. _____
58. _____
59. _____
60. _____

UNIT TEST ANSWER SHEET

Occupational Ares: Automotive
File Code: 37.06
Name:
Family Pay Number: Sex: M F (Circle 1)

ANSWERS

0101	1.	D		21.	C	0110	41.	B
	2.	D		22.	C		42.	A
	3.	B	0106	23.	D	0111	43.	A
	4.	D		24.	B	0112	44.	A
	5.	D		25.	B		45.	A
0102	6.	B		26.	D	0113	46.	A
	7.	D		27.	D		47.	C
0103	8.	A	0107	28.	A		48.	C
	9.	C		29.	B		49.	A
	10.	A		30.	B		50.	C
	11.	D		31.	D		51.	
	12.	B		32.	C		52.	
0104	13.	B	0108	33.	D		53.	
	14.	D		34.	D		54.	
	15.	D		35.	B		55.	
	16.	A		36.	A		56.	
	17.	D		37.	A		57.	
0105	18.	C	0109	38.	A		58.	
	19.	A		39.	B		59.	
	20.	A		40.	D		60.	

File Code: 37.06.01.00.B1-1

Date Published: 3/5/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Experience Guide

UNIT FUNDAMENTALS OF EMISSION SYSTEMS

RATIONALE:

The fundamentals in this unit introduce you to the necessary basics of automotive emission control systems and also enables you to diagnose and service automotive emission control systems.

PREREQUISITES:

37.05.00.00. Automotive Fuel Systems

OBJECTIVE:

Recognize and use the proper operation and procedures for emission control system testing and servicing.

RESOURCES:

Auto Mechanics Fundamentals. Martin W. Stockel, Goodheart-Willcox Company, Inc.
National Service Data. Mitchel Manuals, Inc.

Automobile equipped with: air pump and check valve
air injection
anti-afterburn valve
emission control system:
Chrysler
Ford
General Motors

Automobile needing: PCV valve inspection and service
exhaust efficiency test

Compressed air
Exhaust analyzer
Fender covers
Replacement parts as needed

Tools, Basic Hand:

Chisel and Punch Set
5/32" Pin Punch
3/16" Solid

Gauge, feeler (.002" - .025")

Principal Author(s): C. Schramm/W. Osland

Resources cont.:

Hammer, ball peen
Hammer, plastic tip
Handle, speed
Hex Key Set

Pliers, diagonal cutting
Pliers, needle nose

Scraper, gasket
Screwdriver, standard (Set)
Screwdriver, phillips (Set)
Screw starter

Socket Set (3/8" drive)
  extension (3")
  ratchet

Socket Set (1/4" drive)
  extension (3")
  handle (6" flex)
  ratchet

Socket, spark plug
  extension (6")

Wrench, combination (Set)
Wrench, combination ignition (Set)

GENERAL INSTRUCTIONS:

This Unit consists of thirteen Learning Activity Packages (LAPs). Each LAP will provide specific information for completion of a learning activity.

The general procedure for this Unit is as follows:

1. Read the first assigned Learning Activity Package (LAP).
2. Begin and complete the first assigned LAP.
3. Take and score the LAP test.
4. Turn in the LAP test answer sheet.
5. Determine the reason for any missed items on the LAP test.
6. Proceed to and complete the next assigned LAP in the unit.
7. Complete all required LAPs for the unit by following steps 3 through 6.
8. Take the unit test as described in the Unit LEG "Evaluation Procedures".
9. Proceed to the next assigned unit.

PERFORMANCE ACTIVITIES:

.01 Fundamentals of Emission Control Systems
.02 Servicing PCV
.03 Fundamentals of Ford Systems
.04 Test and Service Ford Systems

.05 Fundamentals of Chrysler Systems
.06 Test and Service Chrysler Systems
.07 Fundamentals of GM Systems
.08 Test and Service GM Systems
.09 Servicing the Air Pump
.10 Servicing the Air Injectors
.11 Servicing Check Valve
.12 Servicing Anti-afterburn Valve
.13 Testing Combustion Efficiency

EVALUATION PROCEDURE:

When pretesting:

1. The student takes the unit multiple-choice pretest.
2. Successful completion is 4 out of 5 items for each LAP part of the pretest.
3. The student then takes a unit performance test if the unit pretest was successfully completed.
4. Satisfactory completion of the performance test is meeting the criteria listed on the performance test.

When post testing:

1. The student takes a multiple-choice unit post test and a unit performance test.
2. Successful unit completion is meeting the listed criteria for the performance test.
3. Score at least 80% correct on the unit post test and 80% correct on the unit performance test.

FOLLOW-THROUGH:

Go to the first assigned Learning Activity Package (LAP) listed on your Student Progress Record (SPR).

Student: _____ File Code: 37.06.01.00.B1-2

Date: _____ Date Published: 3/15/76

UNIT PRETEST: FUNDAMENTALS OF EMISSION SYSTEMS

37 06.01.01.

1. The exhaust and crank case emission make up the major source of:

   a. oxygen.
   b. carbon dioxide.
   c. hydrocarbons.
   d. crank case ventilation.

2. The function of a check valve is to:

   a. prevent backfeeding of hot exhaust into hose or pump.
   b. prevent backfeeding of gasoline into the pump.
   c. let exhaust gases escape from the crank case.
   d. control the amount of gas entering the float bowl.

3. The anti-backfire valve does what to prevent backfire?

   a. admits a rush of air into the intake manifold.
   b. stops back pressure in the lines by closing the air line.
   c. opens to let more gas in the lines to equalize pressure in the lines.
   d. shuts off air to the intake manifold thus restricting the backfire to just the lines.

4. It is important to provide adequate ventilation to systems to prevent:

   a. backfiring.
   b. moisture, hot gases, and excessive pressure build-up.
   c. air pollution.
   d. hydrocarbon emission.

5. You determine the amount of oil in the oil pan by:

   a. oil pressure indicated by an electric pressure gauge.
   b. using oil pressure gauges.
   c. using an oil light.
   d. using a dipstick.

37.06.01.02.

6. You would clean out the metering orifice in a PCV system by:

   a. washing in solvent and blowing dry.
   b. using air.
   c. using a clean rag.
   d. drilling out.

37.06.01.02. cont.

7. A PCV system can be checked by:

   a. checking your vacuum in the carburetor.
   b. checking your gas mileage.
   c. a special valve tester over the filler caphole.
   d. air leaking in your lines if PCV system is bad.

37.06.01.03.

8. A Ford IMCO carburetor idle screws equipped with limiters:

   a. decrease the amount of iso-octane and heptane in the fuel lines.
   b. lower the viscosity of fuel in the lines.
   c. increase the amount of carbon in the carburetor.
   d. promote a more complete combustion of the air-fuel mixture.

9. With a Ford calibrated carburetor it is poor practice to:

   a. increase the richness of the fuel-air mixture.
   b. decrease the richness of the fuel-air mixture.
   c. lower exhaust emission.
   d. impair exhaust backfire.

10. By retarding the spark on a Ford IMCO unit you can:

   a. reduce emission from the exhaust.
   b. increase emission from the exhaust.
   c. reduce emission from the intake manifold.
   d. increase emission from the intake manifold.

11. The Ford Thermactor emission system distributes fresh air from the air pump to the:

   a. vacuum advance on the distributor.
   b. manifold vacuum connection.
   c. individual exhaust ports.
   d. intake manifold.

12.

37.06.01.04.

13. On an Auto Therm Air Cleaner System, when the air temperature reaches 130 degrees F., where is the air drawn from?

    a. the intake manifold.
    b. the shroud at the exhaust manifold.
    c. outside of the car.
    d. the engine compartment.

14. On the Ford Electronic Distributor Modulator, when the speed is below 23 mph on acceleration, it operates to:

    a. draw air from outside of car only.
    b. advance spark.
    c. prevent spark advance.
    d. draw air from the exhaust manifold only.

15. The Ford Electronic Spark Control System (E.S.C.) reduces the exhaust emissions of an engine by providing vacuum spark advance only at speeds above:

    a. 20 mph.
    b. 24 mph.
    c. 12 mph.
    d. 5 mph.

16. The Ford Spark Delay Valve has the purpose of further reducing emissions by delaying the spark advance during:

    a. rapid deceleration.
    b. rapid acceleration.
    c. normal engine road speeds.
    d. normal engine idle conditions.

17. The Ford Delay Vacuum Bypass System (DVB) is designed under varying ambient temperatures and vehicle speeds to:

    a. delay gas flow into the carburetor.
    b. delay distributor vacuum advance.
    c. advance distributor vacuum.
    d. produce a limited amount of gas flow.

37.06.01.05.

18.

37.06.01.05. cont.

19. The system used by Chrysler Corporation cars is called:

a. cleaner air package.
b. air guard system.
c. thermactor system.
d. air injection reactor.

20.

21.

22.

37.06.01.06.

23. In the Chrysler air injection emission system, fresh air is pumped into the exhaust valves to:

a. insure a steady amount of clean air to distributor.
b. increase engine horsepower.
c. burn the unburned portion of exhaust gases.
d. prevent flooding when starting.

24. The Chrysler Clean Air package is engineered to continuously control carburetion and ignition at the best settings for performance and combustion during:

a. all driving conditions.
b. normal driving conditions.
c. high temperature driving conditions.
d. low temperature driving conditions.

37.06.01.06. cont.

25. The Chrysler Cleaner Air System employs higher inlet air temperature, higher idle speeds, retarded ignition timing, leaner carburetor mixtures and lower compression to:

    a. increase the horsepower of the engine.
    b. reduce exhaust emissions.
    c. increase the fuel input into the carburetor.
    d. increase the fuel mileage.

26. The NOx system, in a Chrysler, controls nitrous oxides emissions by allowing vacuum spark advance only in what conditions?

    a. low gear.
    b. high gear.
    c. speeds below 30 mph.
    d. speeds below 15 mph.

27. The distributor solenoid, in a Chrysler, retards the ignition timing to reduce emissions during:

    a. hot idle conditions.
    b. cold idle conditions.
    c. normal operating conditions.
    d. cold operating conditions.

37.06.01.07.

28. General Motors emission systems have a:

    a. controlled combustion system.
    b. thermactor system.
    c. air guard system.
    d. engine mod system.

29. On a General Motors emission system, the tubes leading to each cylinder exhaust port are made of:

    a. aluminum.
    b. stainless steel.
    c. cast iron.
    d. pewter.

30. The valves in a General Motors emission system which are located on air manifolds to prevent back flow of exhaust gases into air injection lines are called the:

    a. exhaust valves.
    b. pressure relief valves.
    c. check valves.
    d. diverter valves.

37.06.01.07. cont.

31. A valve, on General Motors emission systems, which is incorporated in the system to prevent backfire during deceleration is the:

    a. check valve.
    b. diverter valve.
    c. pressure relief valve.
    d. crank case vent valve.

32. On the General Motors emission system the thermostatically controlled air cleaner is designed to keep the air entering the carburetor at approximately:

    a. 500 degrees.
    b. 1,500 degrees.
    c. 2,000 degrees.
    d. 100 degrees.

37.06.01.08.

33. The Combined Emission Control system on a GM System is designed to provide vacuum spark advance during:

    a. high gear deceleration.
    b. low gear operation.
    c. idling gear operation.
    d. high gear operation.

34. In the General Motors (S.C.S.) system, the vacuum spark advance is controlled by:

    a. the vehicle's speed.
    b. high gear operation.
    c. low gear deceleration.
    d. high gear deceleration.

35. To test the GM (S.C.S.) system you raise the rear wheels, start the engine and accelerate it while watching the timing marks on the harmonic balancer. When the car speed exceeds 38 mph, the timing should:

    a. stay the same.
    b. retard 10 degrees.
    c. advance.
    d. retard not more than 5 degrees.

36. On a General Motors Exhaust Gas Recirculation system (EGR), the exhaust gases are induced into the:

    a. distributor vacuum diaphragm.
    b. exhaust manifold.
    c. carburetor during normal operating speeds.
    d. intake manifold of throttle positions other than idle.

37.06.01.08. cont.

37. The thermostatically controlled air cleaner in the CM controlled Combustion System, is designed to keep the air entering the carburetor at approximately what temperature?

a. 100 degrees F.
b. 85 degrees F.
c. 65 degrees F.
d. 120 degrees F.

37.06.01.09.

38.

39. When you install a new centrifugal filter fan, you do so by:

a. drawing evenly by alternating torquing pulley bolts.
b. tapping it on evenly using a hammer.
c. pressing it on with a jack.
d. heating the filter fan so it will slip over the rotor shaft.

40. When replacing a pump exhaust tube, you would replace by:

a. using a pipe wrench to screw tube in.
b. tapping with a small hammer.
c. tapping with a block of wood.
d. putting tube in dry ice to shrink it, so it will slide in.

37.06.01.10.

41. When do you inspect air-injection tubes?

a. periodic checks of six months.
b. whenever the cylinder head or exhaust manifolds are removed.
c. periodic checks of once a year.
d. periodic checks of four months.

42. To remove carbon build-up from an air-injection tube you would:

a. let set in cleaning solvent a day and then blow off carbon with air.
b. use a drill bit.
c. use a wire brush.
d. use penetrating oil.

37.06.01.11.

43. Check valves in an emission system should be checked when?

a. whenever there are no exhaust gases in the air pump.
b. whenever the hose from the check valve is disconnected.
c. periodic checks of every six months.
d. periodic checks of every four months.

37.06.01.12.

44. When an anti-afterburn valve is not functioning you:

a. bypass it by hooking hoses together.
b. take it apart and clean it in solvent.
c. replace it.
d. take it apart and clean by blowing air through it.

45. To check the anti-afterburn valve you disconnect the valve inlet hose from valve and race the engine rapidly. The moment accelerator is released, air should be sucked into valve. How long can air be sucked into the valve before it should be replaced?

a. 2 seconds.
b. 10 seconds.
c. 20 seconds.
d. 5 seconds.

37.06.01.13.

46. When testing combustion efficiency in an emission system, you would hook your analyzer:

a. in the exhaust pipe.
b. in the exhaust manifold.
c. in the intake manifold.
d. in the fuel outlet on the carburetor.

47. When you have a dual exhaust and are checking the combustion efficiency on an emission system, it is important to:

a. disconnect the vacuum advance on the carburetor.
b. put the analyzer in both tail pipes.
c. plug one tail pipe when hooking the analyzer.
d. put the analyzer in the left tail pipe.

48. When hooking up the combustion analyzer when testing the combustion efficiency on an emission system, the analyzer's probe should be how far in the hook-up?

a. 2".
b. 1/2".
c. 18".
d. 6".

37.06.01.13. cont.

49. When adjusting the mixture screws on the carburetor, you should let the combustion analyzer set for how long? (when taking a combustion efficiency test on an emission system)

a. 5 seconds.
b. not more than 10 seconds.
c. 10 seconds.
d. 3 seconds.

50. In order to take a combustion efficiency check, you must have the engine and analyzer at what temperature?

a. hot operating temperature.
b. cold operating temperature.
c. normal operating temperature.
d. it doesn't make any difference.

UNIT PRETEST ANSWER KEY: FUNDAMENTALS OF EMISSION CONTROL SYSTEMS

LAP .01

1. c
2. a
3. a
4. b
5. d

LAP .02

6. a
7. c

LAP .03

8. d
9. a
10. a
11. c
12. d

LAP .04

13. d
14. c
15. b
16. b
17. b

LAP .05

18. a
19. a
20. c
21. b
22. d

LAP .06

23. c
24. a
25. b
26. b
27. a

LAP .07

28. a
29. b
30. c
31. b
32. d

LAP .08

33. d
34. a
35. c
36. d
37. a

LAP .09

38. c
39. a
40. c

LAP .10

41. b
42. c

LAP .11

43. b

LAP .12

44. c
45. d

LAP .13

46. a
47. d
48. c
49. c
50. c

File Code: 37.06.01.01.B1-0

Date Published: 10/5/77

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: FUNDAMENTALS OF EMISSION CONTROL SYSTEMS

OBJECTIVE:

Recognize the components and proper operation of emission control systems.

EVALUATION PROCEDURE:

Answer all of the study questions correctly.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

Auto Mechanics Fundamentals, Stockel.

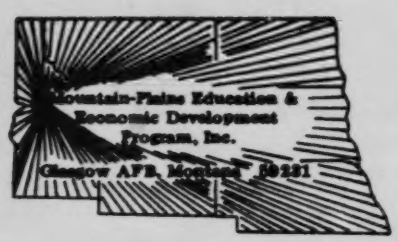
PROCEDURE:

1. Do the following assignments using Auto Mechanics Fundamentals:
   a. Read Chapter 5, pages 106-118, beginning with "Emission Control Devices."
   b. Study Figures 5-41 through 5-64 closely for added detailed information.
   c. Study the detailed information on page 116.
   d. Neatly answer questions 27,28,33, and 34 on separate paper.
2. When completed, give answer sheet to instructor for evaluation.
3. Proceed to next assigned LAP.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: _____

Date: _____ Date Published: 3/8/76



LAP TEST: FUNDAMENTALS OF EMISSION CONTROL SYSTEMS

1. Water, nitrogen, hydrogen, carbon dioxide and carbon monoxide make up about what percent of the exhaust from the average car engine?

   a. 99.9%
   b. 40%
   c. 80%
   d. 75%

2. By connecting a hose between the engine interior and the intake manifold, engine vacuum will draw the crank case fumes out of the engine and into the cylinders where the gases will be burned along with the regular fuel charge. This is known as:

   a. positive crank case ventilation.
   b. negative crank case ventilation.
   c. disposing of waste materials.
   d. hydrocarbon exhaust fuel flow.

3. When the engine is under a load, the intake manifold vacuum will drop. When this happens, the PCV valve:

   a. restricts the flow of crank case fumes to the manifold.
   b. will close completely.
   c. will open completely.
   d. will not function at all.

4. On an air injection system you have an air pump drawing fresh air (through the filter) which is operated by:

   a. the carburetor.
   b. a gear system.
   c. a cam system.
   d. the engine and belt system.

5. A check valve is forced open by:

   a. the camshaft.
   b. a linkage from the throttle linkage.
   c. air passing through to the distribution manifold.
   d. the crankshaft.

LAP TEST ANSWER KEY: FUNDAMENTALS OF EMISSION CONTROL SYSTEMS

LAP 01

1. a
2. a
3. c
4. d
5. c

File Code: 37.06.01.02.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Servicing PCV

OBJECTIVE:

Inspect and properly service a P.C.V. valve.

EVALUATION PROCEDURE:

80% correct on performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Automobile needing a PCV valve inspection and service
Fender covers
Valves
Tools, basic hand: (See Unit LEG)

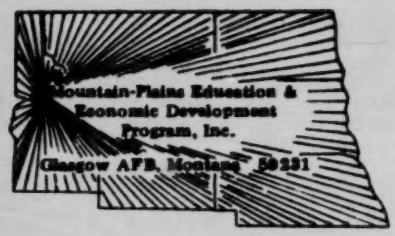
PROCEDURE:

1. Place fender covers.
2. Refer to manuals' section on PCV valve service for the particular vehicle you are servicing for the service procedure.
3. Follow the procedure closely and record results on work order. NOTE: Due to the variety of PCV systems, it is necessary to follow the manufacturers' recommended service procedure and specifications for the best results.
4. Replace valve if defective.
5. Contact the instructor and demonstrate proper service procedure and discuss your results with him.
6. Upon satisfactory completion, clean and return all tools and equipment.
7. Proceed to the next LAP.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: 37.06.01.02.B1-2

Date: _____ Date Published: 3/5/76



LAP TEST: SERVICING PCV

1. A clogged PCV system will result in:

   a. smooth acceleration but stumbling occurs on deceleration.
   b. a fast idle.
   c. erratic idle speed.
   d. no gas coming to the carburetor.

2. You would clean out the metering orifice in a PCV system by:

   a. washing in solvent and blowing dry.
   b. using air.
   c. using a clean rag.
   d. using a drill bit.

LAP TEST ANSWER KEY: SERVICING PCV

1. c
2. a

File Code: 37.06.01.03.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Ford Systems

OBJECTIVE:

Diagram the Ford emission system identifying components and describing the operation of each.

EVALUATION PROCEDURE:

80% correct on evaluation of diagram by instructor using criteria from proper repair manual.

Eight correct responses to a ten-item multiple-choice objective test.

RESOURCES:

National Service Data, Mitchell Manuals, Inc.

PROCEDURE:

1. Obtain a recent manual copy and secure a quiet place to study.
2. Using the indexes as a guide, locate first the Carburetor section.
3. From the carburetion index, locate the Ford emission system and pages from the Exhaust Emission Equipment listing.
4. Carefully study the Ford system by reading the Description and Operation of each component.

   NOTE: It is necessary for a mechanic to know the components and operation of each clearly to properly diagnose and repair any defective emission system. For this reason, most manuals do carry an emission description section for the mechanic to inform himself on each new system utilized.
5. Using separate paper, draw a simple diagram of the most common new Ford system including all the components, names of each part, how they are connected, and a short description by each of how and when they operate.

Principal Author(s): J. Anderson/W. Osland

NOTE: When this diagram is completed satisfactorily and approved by the instructor, you may keep it and place it with your notes and other valuable information that you are collecting during your training for future reference. (Record manual name and year, and pages of diagram information.)

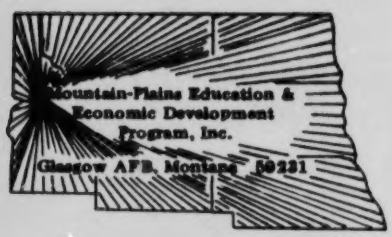
6. Return manual.

7. Take the LAP test.

8. Proceed to the next LAP.

Student: _____ File Code: 37.06.01.03.B1-2

Date: _____ Date Published: 3/8/76



LAP TEST: FUNDAMENTALS OF FORD SYSTEMS

1. The Ford IMCO exhaust emission control system is designed to:

   a. reduce the amount of carbon monoxide and hydrocarbons formed in the engine.
   b. reduce the amount of heptane and iso-octane formed in the engine.
   c. reduce the amount of distillation in an engine.
   d. reduce the volatility of the fuel.

2. A Ford IMCO carburetor idle screws equipped with limiters:

   a. decrease the amount of iso-octane and heptane in the fuel lines.
   b. lower the viscosity of fuel in the lines.
   c. increase the amount of carbon in the carburetor.
   d. promote a more complete combustion of the air-fuel mixture.

4. By retarding the spark on a Ford IMCO unit you can:

   a. reduce emission from the exhaust.
   b. increase emission from the exhaust.
   c. reduce emission from the intake manifold.
   d. increase emission from the intake manifold.

5. The Ford Thermactor emission system distributes fresh air from the air pump to the:

   a. vacuum advance on the distributor.
   b. manifold vacuum connection.
   c. individual exhaust ports.
   d. intake manifold.

LAP TEST ANSWER KEY: FUNDAMENTALS OF FORD SYSTEMS

1. a
2. d
3. [illegible]
4. a
5. c

File Code: 37.06.01.04.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Test and Service Ford System

OBJECTIVE:

Recognize the correct procedure to inspect and service a Ford emission system.

EVALUATION PROCEDURE:

80% correct on performance test.
80% correct on a multiple-choice objective test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Exhaust hose
Fender covers
Ford equipped with emission control system needing service
Replacement parts as needed
Tools, basic hand: (See Unit LEG)

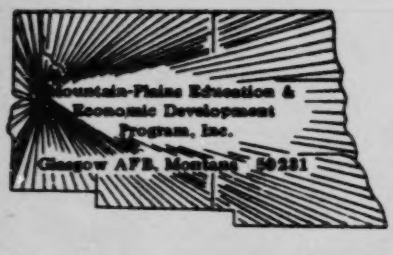
PROCEDURE:

1. Place fender covers.
2. Connect exhaust removal equipment.
3. Refer to the manual's section on emission system inspection and service for the model and year car you are working on.
4. Follow the procedure closely. Record the results.
5. Replace any defective parts.
6. Contact the instructor and demonstrate the inspection procedure to him. Be prepared to discuss your results.
7. Upon satisfactory completion, clean and return all equipment.
8. Take and score the LAP test.
9. Upon successful completion, proceed to the next LAP.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: 37.06.01.04.B1-2

Date: _____ Date Published: 3/8/76



LAP TEST: TEST AND SERVICE FORD SYSTEMS

1. On an Auto Therm Air Cleaner System, when the air temperature reaches 130 degrees F., where is the air drawn from?

   a. the intake manifold.
   b. the shroud at the exhaust manifold.
   c. outside of the car.
   d. the engine compartment.

2. The Ford IMCO system has two diaphragm distributors; this unit uses a separate diaphragm to retard the spark timing under what conditions?

   a. open throttle conditions.
   b. hot weather conditions.
   c. cold weather conditions.
   d. closed throttle conditions.

3. In the Ford IMCO system, the distributor vacuum control valve has the function of lowering engine temperature. It is exposed to the cooling system, and when coolant temperature exceeds normal limits during long idle periods, the valve opens a vacuum passage to the advance diaphragm of the distributor which:

   a. brings in outside air.
   b. speeds up the engine.
   c. brings in hot air from the exhaust.
   d. shuts the fan off.

4. The Ford Electronic Spark Control System (E.S.C.) reduces the exhaust emissions of an engine by providing vacuum spark advance only at speeds above:

   a. 20 mph.
   b. 24 mph.
   c. 12 mph.
   d. 5 mph.

5. The Ford Spark Delay Valve has the purpose of further reducing emissions by delaying the spark advance during:

   a. rapid deceleration.
   b. rapid acceleration.
   c. normal engine road speeds.
   d. normal engine idle conditions.

LAP TEST ANSWER KEY: TEST AND SERVICE FORD SYSTEM

1. d
2. d
3. b
4. b
5. b

File Code: 37.06.01.05.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Fundamentals of Chrysler Systems

OBJECTIVE:

Diagram the Chrysler emission control system identifying components and describing the operation of each.

EVALUATION PROCEDURE:

80% correct on evaluation of diagram by instructor using criteria from proper repair manual.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data, Mitchell Manuals, Inc.

PROCEDURE:

1. Obtain a recent manual copy and secure a quiet place to study.
2. Using the indexes as guides, locate first the Carburetor section.
3. From the Carburetion index, locate the Chrysler Emission System and pages from the Exhaust Emission Equipment listing.
4. Carefully study the Chrysler system by reading the Description and Operation of each component.

   NOTE: It is necessary for a competent mechanic to know the components and operation of each clearly to effectively diagnose and repair any defective emission system. For this reason, most manuals do carry an emission description section for the mechanic to inform himself on each new system utilized.
5. Using a separate paper, draw a simple diagram of the most common new Chrysler system including all the components, names of each part, how they are connected, and a brief description by each of how and when they operate.

Principal Author(s): J. Anderson/W. Osland

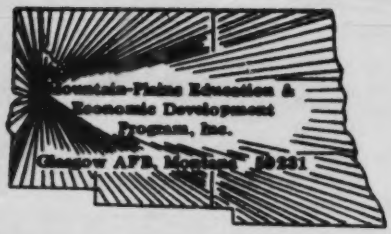
NOTE: When diagram is completed, show it to the instructor for approval. You may file it in your records and notes with the other information you are collecting for future reference while on the job.

6. Return manual.

7. Proceed to next LAP.

Student: _____ File Code: 37.06.01.05.B1-2

Date: _____ Date Published: 3/8/76



LAP TEST: FUNDAMENTALS OF CHRYSLER

1. The system used by Chrysler Corporation cars is called:

   a. Cleaner Air Package.
   b. Air Guard System.
   c. Thermactor System.
   d. IMCO

2. The Chrysler system is mainly designed to most effectively cut down emission exhaust during:

   a. speeds of 30 to 60.
   b. acceleration.
   c. deceleration.
   d. speeds of 60 to 80.

3.

4. On a dual exhaust on a Chrysler engine when checking the air-fuel ratio you would insert exhaust sample pick-up tube where?

   a. Left tail pipe.
   b. Right tail pipe.
   c. Both tail pipes.
   d. On the exhaust manifold.

5. With Chrysler engine at normal operating temperature and carburetor air cleaner in place, automatic transmission in neutral, air conditioning off, you would adjust and set:

   a. the dashpot adjustment.
   b. fast idle speed and ignition timing.
   c. slow idle speed and ignition timing.
   d. vacuum advance central value.

LAP TEST ANSWER KEY: FUNDAMENTALS OF CHRYSLER SYSTEM

1. a
2. c
3. b
4. a
5. c

File Code: 37.06.01.06.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Test and Service Chrysler System

OBJECTIVE:

Recognize and use the correct procedure to inspect and service a Chrysler Emission System.

EVALUATION PROCEDURE:

80% correct on performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Chrysler equipped with emission control system
Exhaust hose
Fender covers
Tools, basic hand: (See Unit LEG)

PROCEDURE:

1. Place fender covers.
2. Connect exhaust removal equipment.
3. Refer to the manuals' section on emission system inspection and service for the model and year you are working on.
4. Follow the inspection and service procedure closely.
5. Replace any defective parts.
6. When completed, contact the instructor and demonstrate the inspection procedure to him. Be prepared to discuss your results.
7. Upon satisfactory completion, clean and return all tools and equipment.
8. Proceed to next LAP.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: _____

Date: _____ Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TEST AND SERVICE CHRYSLER

1. The Chrysler Cleaner Air Package is engineered to continuously control carburetion and ignition at the best settings for performance and combustion during:

   a. all driving conditions.
   b. normal driving conditions.
   c. high temperature driving conditions.
   d. low temperature driving conditions.

2. The Chrysler Cleaner Air System employs higher inlet air temperature, higher idle speeds, retarded ignition timing, leaner carburetor mixtures and lower compression to:

   a. increase the horsepower of the engine.
   b. reduce exhaust emissions.
   c. increase the fuel input into the carburetor.
   d. increase the fuel mileage.

3. In the Chrysler Exhaust Gas Recirculation System (EGR), exhaust gases are circulated to:

   a. retard the vacuum advance system.
   b. warm up the engine exhaust system.
   c. activate the vacuum advance system.
   d. dilute the incoming fuel-air mixture.

4. The Chrysler Orifice Spark Advance control is used in the control of oxides of nitrogen. The system controls the:

   a. compression of the pistons.
   b. vacuum advance to the distributor instantaneously.
   c. temperature of the coolant system.
   d. vacuum advance activator of the distributor.

5. To test the NOx solenoid vacuum valve you disconnect the vacuum hose at the distributor vacuum unit, start the engine and allow it to idle with throttle valves fully closed. Then you take the timing light and direct at the timing marks and disconnect the distributor solenoid ground lead at the carburetor. The timing should:

   a. retard 5 degrees.
   b. stay the same.
   c. advance 5 degrees.
   d. retard 10 degrees.

LAP TEST ANSWER KEY: TEST AND SERVICE CHRYSLER EMISSION SYSTEMS

1. a
2. b
3. d
4. d
5. c

File Code: 37.06.01.07.B1-0

Date Published: 13/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: General Motors System

OBJECTIVE:

Diagram the General Motors emission control system identifying components and describing the operation of each.

EVALUATION PROCEDURE:

80% correct on evaluation of diagram by instructor using criteria from proper repair manual.

Eight correct responses to a ten-item multiple-choice objective test.

RESOURCES:

National Service Data, Mitchell Manuals, Inc.

PROCEDURE:

1. Obtain a recent manual copy and secure a quiet place to study.
2. Using the index as guides, locate first the Carburetor section.
3. From the Carburetor index, locate the General Motors Emission System and pages from the Exhaust Emission Equipment listing.
4. Carefully study the General Motors system by reading the Description and Operation of each component.

   NOTE: It is necessary for a competent mechanic to know the components and operation of each clearly to effectively diagnose and repair any defective emission system. For this reason, most manuals do carry an emission description section for the mechanic to inform himself on each new system utilized.
5. Using separate paper, draw a simple diagram of the most common new General Motors emission system including all the components, names of each part, and how they are connected, and a brief description by each of how and when they operate.

Principal Author(s): J. Anderson/W. Osland

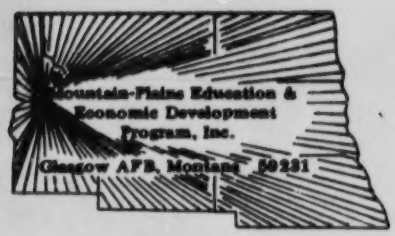
NOTE: When the diagram is completed, show it to the instructor for approval. You may file it in your records and notes with your other valuable information collected during training for future reference while on the job.

6. Return manual.

7. Take and score the LAP test.

Student: _____ File Code: 37.08.01.07.B1-2

Date: _____ Date Published: 3/8/76



LAP TEST: FUNDAMENTALS OF GM SYSTEMS

1. The General Motors emission system with air injection should not interchange which parts, with a car without air injection?

   a. carburetors and air cleaners.
   b. carburetors and valves.
   c. carburetors and distributors.
   d. carburetors and exhaust manifolds.

2. On a General Motors emission system, the tubes leading to each cylinder exhaust part are made of:

   a. aluminum.
   b. stainless steel.
   c. cast iron.
   d. pewter.

3. The valves in a General Motors emission system which are located on air manifolds to prevent back flow of exhaust gases into air injection lines are called the:

   a. exhaust valves.
   b. pressure relief valves.
   c. check valves.
   d. diverter valves.

4. A valve, on General Motors emission systems, which is incorporated in the system to prevent backfire during deceleration is the:

   a. check valve.
   b. diverter valve.
   c. pressure relief valve.
   d. crank case vent valve.

5. On the General Motors emission system the thermostatically controlled air cleaner is designed to keep the air entering the carburetor at approximately:

   a. 500 degrees.
   b. 1500 degrees.
   c. 2000 degrees.
   d. 100 degrees.

LAP TEST ANSWER KEY: FUNDAMENTALS OF GM SYSTEMS

1. c
2. b
3. c
4. b
5. d

File Code: 37.06.01.08.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Test and Service GM System

OBJECTIVE:

Recognize and use the correct procedure to inspect and service a General Motors Emission System.

EVALUATION PROCEDURE:

Instructor will evaluate system when completed in accordance with manufacturers' specifications.

80% correct on performance test.
80% correct on a multiple-choice objective test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Exhaust hose
Fender covers
General Motors Automobile needing emission system service
Tools, basic hand: (See Unit LEG)

PROCEDURE:

1. Place fender cover.
2. Connect exhaust removal equipment.
3. Refer to the manuals' section on emission system inspection and service for the model and year you are working on.
4. Follow the inspection procedure closely. Record your results.
5. Replace any defective parts.
6. When completed, demonstrate to the instructor the inspection procedure. Be prepared to discuss your results.
7. Upon satisfactory completion, clean and return all tools and equipment.
8. Take and score the LAP test.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: 37.06.01.08.B1-2

Date: _____ Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TEST AND SERVICE GM SYSTEMS

1. The Combined Emission Control system on a GM System is designed to provide vacuum spark advance during:

   a. high gear deceleration.
   b. low gear operation.
   c. idling.
   d. high gear operation.

2. In the General Motors (S.C.S.) system, the vacuum spark advance is controlled by:

   a. the vehicle's speed.
   b. high gear operation.
   c. low gear operation
   d. high gear deceleration.

3. On a General Motors Exhaust Gas Recirculation system (EGR), the exhaust gases are induced into the:

   a. distributor vacuum diaphragm.
   b. exhaust manifold.
   c. carburetor during normal operating speeds.
   d. intake manifold at throttle positions other than idle.

4. To test the Transmission Controlled Spark Solenoid you disconnect the hoses and electrical connector, connect hose to distributor vacuum port and blow into it. Air should come out of the vacuum port that was connected to the vacuum source. You then connect a jumper from one terminal to ground and connect the other terminal to a 12-volt source. What should happen?

   a. the distributor vacuum advance should retard 5 degrees.
   b. a click should be heard and air should suck into the vent port.
   c. the distributor vacuum advance should advance 5 degrees.
   d. a click should be heard and air should come out of the vent port.

5. The termostatically controlled air cleaner, in the GM Controlled Combustion System, is designed to keep the air entering the carburetor at approximately what temperature?

   a. 100 degrees F.
   b. 85 degrees F.
   c. 65 degrees F.
   d. 120 degrees F.

LAP TEST ANSWER KEY: TEST AND SERVICE GM EMISSION SYSTEMS

1. d
2. a
3. d
4. d
5. a

File Code: 37.06.01.09.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Servicing the Air Pump

OBJECTIVE:

Recognize and use the proper procedure to service an emission control air pump.

EVALUATION PROCEDURE:

80% correct on performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Fender covers
Automobile equipped with an air pump
Tools, basic hand: (See Unit LEG)

PROCEDURE:

1. Place fender covers on vehicle.
2. Test the output of air at the discharge port of the air pump. Refer to the repair manual procedure and specifications.
3. Test air pump intake port for sufficient vacuum. Refer to the repair manual test procedure and specifications.
4. Inspect all hoses and connections for wear or damage.
5. Test for belt tension. Refer to manual for correct tightness. Adjust as necessary.
6. Ask the instructor to evaluate your completed work.
7. Clean and return all tools and equipment.
8. Clean work area.
9. Proceed to next LAP.

Principal Author(s): C. Schramm/W. Osland

File Code: 37.06.01.10.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Servicing Air Injectors

OBJECTIVE:

Recognize and use the correct procedure to service an emission control air injector.

EVALUATION PROCEDURE:

80% correct on performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

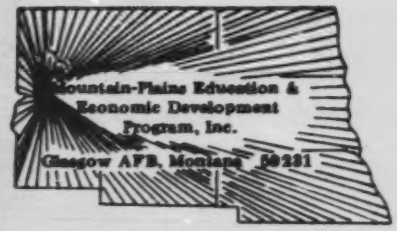
Compressed air
Automobile equipped with air injector
Compressed air
Fender covers
Oil
Tools, basic hand: (See Unit LEG)

PROCEDURE:

1. **Place fender covers.**
2. **Remove air injection tubes.**
3. **Inspect air injection tubes for signs of leakage or broken lines.**
4. **Check tubes for clear unrestricted passageways. Blow air through tubes.**
5. **Re-install tubes. Add oil to threads to ease re-installation.**
6. **Clean and return all tools and equipment.**
7. **Ask the instructor to evaluate your work.**
8. **Clean work area.**
9. **Proceed to next LAP.**

Student: _____ File Code: 37.06.01.10.B1-2

Date: _____ Date Published: 3/5/76



LAP TEST: SERVICING AIR INJECTORS

1. When do you inspect air injection tubes?

   a. periodic checks every six months.
   b. whenever the cylinder head or exhaust manifolds are removed.
   c. periodic checks once every year.
   d. periodic checks every four months.

2. To remove carbon build-up from an air injection tube you would:

   a. let set in cleaning solvent for a day and then blow off carbon with air.
   b. use a drill bit.
   c. use a wire brush.
   d. use penetrating oil.

LAP TEST ANSWER KEY: SERVICING AIR INJECTORS

1. b
2. c

File Code: 37.06.01.11.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Servicing Check Valve

OBJECTIVE:

Recognize and use the correct procedure to service an emission control check valve.

EVALUATION PROCEDURE:

80% correct on performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Automobile equipped with air pump check valve.
Fender covers
Tools, basic hand: (See Unit LEG)

PROCEDURE:

1. Place fender covers.
2. Inspect check valve for proper operation. Refer to repair manual for correct inspection procedure and specifications.
3. Record results on work order.
4. Ask the instructor to evaluate your completed inspection.
5. Clean and return all tools and equipment.
6. Clean work area.
7. Proceed to the next LAP.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: 37.06.01.11.B1-2

Date: _____ Date Published: 3/5/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: SERVICING CHECK VALVE

1. Check valves in an emission system should be checked when?

   a. whenever there are no exhaust gases in the air pump.
   b. whenever the hose from the check valve is disconnected.
   c. periodic checks of every six months.
   d. periodic checks of every four months.

LAP TEST ANSWER KEY: SERVICING CHECK VALVE

1. b

File Code: 37.06.01.12.B1-0

Date Published: 3/8/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Servicing Anti-Afterburn Valve

OBJECTIVE:

Recognize and use the correct procedure to service an emission control anti-afterburn valve.

EVALUATION PROCEDURE:

80% correct on performance test.
80% correct on multiple-choice objective test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.

Automobile equipped with anti-afterburn valve
Fender covers
Tools, basic hand: (See Unit LEG)

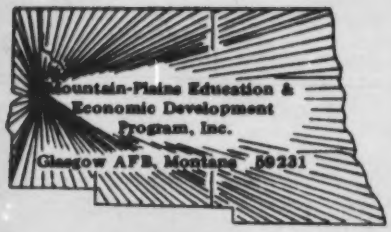
PROCEDURE:

1. Place fender covers.
2. Inspect and service the anti-afterburn valve. Refer to manual for correct procedure and specifications.
3. Correct as necessary.
4. Report results on work order.
5. Ask the instructor to evaluate your completed work.
6. Clean and return all tools and equipment.
7. Clean work area.
8. Obtain a copy of the LAP test 37.07.02.05. Answer all of the questions and return the test to the instructor for evaluation.
9. Upon successful completion, proceed to the next LAP.

Principal Author(s): J. Anderson/W. Osland

Student: _____ File Code: 37.06.01.12.B1-2

Date: _____ Date Published: 3/5/76



LAP TEST: SERVICING ANTI-AFTERBURN VALVE

1. When an anti-afterburn valve is not functioning you:

   a. bypass it by hooking hoses together.
   b. take it apart and clean it in solvent.
   c. replace it.
   d. take it apart and clean by blowing air through it.

2. To check the anti-afterburn valve, you disconnect the valve inlet hose from valve and race the engine rapidly. The moment the accelerator is released, air should be sucked into valve. How long can air be sucked into the valve before it should be replaced?

   a. 2 seconds
   b. 10 seconds
   c. 20 seconds
   d. 5 seconds

LAP TEST ANSWER KEY: SERVICING ANTI-AFTERBURN VALVE

1. c
2. d

File Code: 37.06.01.13 B1-0

Date Published: 3/5/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

Learning Activity Package

Student: _____

Date: _____

PERFORMANCE ACTIVITY: Testing Combustion Efficiency

OBJECTIVE:

Perform the combustion efficiency test according to the manufacturer's specifications.

EVALUATION PROCEDURE:

80% correct on performance test.

Successful completion of this LAP is determined by correctly answering 8 out of 10 items on a multiple-choice test.

RESOURCES:

National Service Data. Mitchell Manuals, Inc.
Operator's Manual for Exhaust Analyzer

Automobile needing combustion efficiency test
Exhaust hoses
Fender covers
Tools, basic hand: (See Unit LEG)

PROCEDURE:

1. Place fender covers.
2. Following the hook-up procedure of the operator's manual, properly connect the exhaust analyzer equipment to the automobile.
3. Connect the enhaust removal equipment.
4. Follow the exhaust analyzers operator's manual test procedure to properly analyze the combustion efficiency.
5. Use the repair manual to find the combustion efficiency specifications and the proper method of adjustments.

   NOTE: Due to the variations of exhaust analyzer equipment, it is necessary to refer to the operator's manual to obtain the best results. Also, every manufacturer varies his recommended specifications and

Principal Author(s): J. Anderson/W. Osland

adjustments so it is mandatory to utilize the proper manual for each automobiles specifications and adjustments.

6. Upon completion of combustion efficiency testing, contact the instructor and demonstrate the testing procedure to him. Be prepared to discuss your results with him.

7. Upon satisfactory completion, clean and return all tools and equipment.

8. Proceed to the next LAP.

37.06.01.13.B1-2

Student: _____ File Code: _____

Date: _____ Date Published: 3/5/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

LAP TEST: TESTING COMBUSTION EFFICIENCY

37.06.01.13.

1. When testing combustion efficiency in an emission system, you would hook your analyzer:

   a. in the exhaust pipe.
   b. in the exhaust manifold.
   c. in the intake manifold.
   d. in the fuel outlet on the carburetor.

2. When you have a dual exhaust and are checking the combustion efficiency on an emission system, it is important to:

   a. disconnect the vacuum advance on the carburetor.
   b. put the analyzer in both tail pipes.
   c. plug one tail pipe when hooking the analyzer to the exhaust manifold.
   d. put the analyzer in the left tail pipe.

3. When hooking up the combustion analyzer when testing the combustion efficiency on an emission system, the analyzer's probe should be how far in the hook-up?

   a. 2"
   b. ½"
   c. 18"
   d. 6"

5. In order to take a combustion efficiency check, you must have the engine and analyzer at what temperature?

   a. Hot operating temperature.
   b. Cold operating temperature.
   c. Normal operating temperature.
   d. It doesn't make any difference.

LAP TEST ANSWER KEY: TESTING COMBUSTION EFFICIENCY

LAP 13

1. a
2. d
3. c
4. [redacted]
5. c

Student: _____ File Code: 37.06.01.00.C1-2

Date: _____ Date Published: 3/15/76

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

UNIT POST TEST: FUNDAMENTALS OF EMISSIONS SYSTEMS A

37.06.01.01.

1. Hydrocarbon emission into the atmosphere, when it reacts with sunlight, tends to produce what is called:

   a. exhaust fumes.
   b. photochemical smog.
   c. PCV deposits.
   d. burdon pressure.

2. How many crankcase vent systems are there:

   a. 3.
   b. 1.
   c. 2.
   d. 4.

3. To avoid upsetting the basic carburetor air-fuel ratios for various operating conditions, it is essential that you have a:

   a. PCV control valve.
   c. air pump.
   c. oil filter.
   d. check valve.

4. By a more complete burning of the fuel charge you can:

   a. let more carbon monoxide into the atmosphere.
   b. damage your engine.
   c. shorten the burning action of hydrocarbons.
   d. reduce the exhaust emission.

5. A poisonous gas which is in exhaust fumes is:

   a. sulfur dioxide.
   b. carbon dioxide.
   c. hydrogen oxide.
   d. carbon monoxide.

37.06.01.02.

6. If crank case vent valve is of the crimped type, it can:

   a. be taken apart and filter can be cleaned.
   b. not be cleaned.
   c. not be used again.
   d. not be disassembled for service and cleaning.

37.06.01.02. cont.

7. A PCV system can be checked by:

   a. checking your vacuum in the carburetor.
   b. checking your gas mileage.
   c. a special valve tester over the filler caphole.
   d. air leaking in your lines if PCV system is bad.

37.06.01.03.

8. The Ford IMCO exhaust emission control system is designed to:

   a. reduce the amount of carbon monoxide and hydrocarbons formed in the engine.
   b. reduce the amount of heptane and iso-octane formed in the engine.
   c. reduce the amount of distillation in an engine.
   d. reduce the volatility of the fuel.

9. With a Ford calibrated carburetor it is poor practice to:

   a. increase the richness of the fuel-air mixture.
   b. decrease the richness of the fuel-air mixture.
   c. lower exhaust emission.
   d. impair exhaust backfire.

10. By retarding the spark on a Ford IMCO unit you can:

   a. reduce emission from the exhaust.
   b. increase emission from the exhaust.
   c. reduce emission from the intake manifold.
   d. increase emission from the intake manifold.

11. Ford engineers feel that the location that most effectively mixes exhaust gases and air for effective burning of hydrocarbons is:

   a. the air cleaner.
   b. the intake manifold.
   c. the air horn on the carburetor.
   d. the exhaust port near the exhaust valve seat.

12.

37.06.01.04.

13. On an Auto Therm Air Cleaner System, when you first start your engine, air is drawn from:

    a. the shroud at the exhaust manifold.
    b. the engine compartment.
    c. outside of the car.
    d. the intake manifold.

14. Some Ford Emission systems incorporate a vacuum override motor which has the function of providing additional air to the carburetor during:

    a. cold decelerations.
    b. hot acceleration.
    c. hot deceleration.
    d. cold acceleration.

15. On the Ford Electronic Distributor Modulator, when the speed is below 23 mph on acceleration, it operates to:

    a. draw air from outside of car only.
    b. advance spark.
    c. prevent spark advance.
    d. draw air from the exhaust manifold only.

16. In the Ford Exhaust Gas Recirculation system, the mixture of exhaust gases is diluted thus lowering peak flame temperatures during combustion and limiting the formation of:

    a. warm air entering the carburetor.
    b. advanced spark.
    c. gas circulation or flow.
    d. nitrogen oxides (NOx).

17. The Ford Delay Vacuum Bypass System (DVB) is designed under varying ambient temperatures and vehicle speeds to:

    a. delay gas flow into the carburetor.
    b. delay distributor vacuum advance.
    c. advances distributor vacuum.
    d. produce a limited amount of gas flow.

37.06.01.05.

18.

37.06.01.05. cont.

19. The Chrysler system is mainly designed to most effectively cut down emission exhaust during:

    a. speeds of 30 to 60.
    b. acceleration.
    c. deceleration.
    d. speeds of 60 to 80.

20.

21. On a dual exhaust on a Chrysler engine when checking the air-fuel ratio, you would insert exhaust sample pick-up tube where?

    a. left tail pipe.
    b. right tail pipe.
    c. both tail pipes.
    d. on the exhaust manifold.

22.

37.06.01.06.

23. In the Chrysler air injection emission system, fresh air is pumped into the exhaust valves to:

    a. insure a steady amount of clean air to distributor.
    b. increase engine horsepower.
    c. burn the unburned portion of exhaust gases.
    d. prevent flooding when starting.

24. In the Chrysler Exhaust Gas Recirculation System (EGR), exhaust gases are circulated to:

    a. retard the vacuum advance system.
    b. warm up the engine exhaust system.
    c. activate the vacuum advance system.
    d. dilute the incoming fuel-air mixture.

37.06.01.06. cont.

25. The Chrysler Orifice Spark Advance control is used in the control of oxides of nitrogen. The system controls the:

    a. compression of the pistons.
    b. vacuum advance to the distributor instantaneously.
    c. temperature of the coolant system.
    d. vacuum advance activator of the distributor.

26. The NOx system, in a Chrysler, controls nitrous oxides emissions by allowing vacuum spark advance only in what conditions?

    a. low gear.
    b. high gear.
    c. speeds below 30 mph.
    d. speeds below 15 mph.

27. The distributor solenoid, in a Chrysler, retards the ignition timing to reduce emission during:

    a. hot idle conditions.
    b. cold idle conditions.
    c. normal operating conditions.
    d. cold operating conditions.

37.06.01.07.

28. General Motors emission systems have a:

    a. controlled combustion system.
    b. thermactor system.
    c. air guard system.
    d. engine mod system.

29. On a General Motors emission system, the tubes leading to each cylinder exhaust port are made of:

    a. aluminum.
    b. stainless steel.
    c. cast iron.
    d. pewter.

30. On a General Motors emission system, a valve is located in the discharge cavity of the air pump or in the diverter valve. Its function allows pumping outlet air to bypass air injection system at high engine speeds and loads; this valve is called:

    a. diverter valve.
    b. check valve.
    c. pressure relief valve.
    d. exhaust valve.

37.06.01.07. cont.

31. The valves in a General Motors emission system which are located on air manifolds to prevent back flow of exhaust gases into air injection lines are called the:

    a. exhaust valves.
    b. pressure relief valves.
    c. check valves.
    d. diverter valves.

32. On the General Motors emission system the thermostatically controlled air cleaner is designed to keep the air entering the carburetor at approximately:

    a. 500 degrees.
    b. 1,500 degrees.
    c. 2,000 degrees.
    d. 100 degrees.

37.06.01.08.

33. In the General Motors (S.C.S.) System, the vacuum spark advance is controlled by:

    a. the vehicle's speed.
    b. high gear operation.
    c. low gear operation.
    d. high gear deceleration.

34. To test the GM (S.C.S.) system you raise the rear wheels, start the engine and accelerate it while watching the timing marks on the harmonic balancer. When the car speed exceeds 38 mph, the timing should:

    a. stay the same.
    b. retard 10 degrees.
    c. advance.
    d. retard not more than 5 degrees.

35. On a general Motors Exhaust Gas Recirculation system (EGR), the exhaust gases are induced into the:

    a. distributor vacuum diaphragm.
    b. exhaust manifold.
    c. carburetor during normal operating speeds.
    d. intake manifold at throttle positions other than idle.

36. What is the purpose of the pressure control valve placed between the valve cover and the manifold in the crank case ventilating system?

    a. to provide extra air for idling.
    b. to prevent excess air flow during idling.
    c. to retard the spark.
    d. to decrease air flow when engine speed increases.

37.06.01.08. cont.

37. The thermostatically controlled air cleaner, in the GM Controlled Combustion System, is designed to keep the air entering the carburetor at approximately what temperature?

a. 100 degrees F.
b. 85 degrees F.
c. 65 degrees F.
d. 120 degrees F.

37.06.01.09.

38. The exhaust emission air pump is activated by:

a. the V-belt.
b. the cam shaft.
c. the crank shaft.
d. the pistons.

39.

40. When you install a new centrifugal filter fan, you do so by:

a. drawing evenly by alternating torquing pulley bolts.
b. tapping it on evenly using a hammer.
c. pressing it on with a jack.
d. heating the filter fan so it will slip over the rotor shaft.

37.06.01.10.

41. When do you inspect air-injection tubes?

a. periodic checks of six months.
b. whenever the cylinder head or exhaust manifolds are removed.
c. periodic checks of once a year.
d. periodic checks of four months.

42. How do injection tubes fit into the exhaust manifold?

a. pressed in.
b. by threads.
c. slip in.
d. tapped in.

37.06.01.11.

43. Check valves in an emission system should be checked when?

a. whenever there are no exhaust gases in the air pump.
b. whenever the hose from the check valve is disconnected.
c. periodic checks of every six months.
d. periodic checks of every four months.

37.06.01.11. cont.

44.

37.06.01.12.

45. To check the anti-afterburn valve you disconnect the valve inlet hose from valve and race the engine rapidly. The moment accelerator is released, air should be sucked into valve. How long can air be sucked into the valve before it should be replaced?

a. 2 seconds.
b. 10 seconds.
c. 20 seconds.
d. 5 seconds.

37.06.01.13.

46. When testing combustion efficiency in an emission system, you would hook your analyzer:

a. in the exhaust pipe.
b. in the exhaust manifold.
c. in the intake manifold.
d. in the fuel outlet on the carburetor.

47. When you have a dual exhaust and are checking the combustion efficiency on an emission system, it is important to:

a. disconnect the vacuum advance on the carburetor.
b. put the analyzer in both tail pipes.
c. plug one tail pipe when hooking the analyzer to the exhaust manifold.
d. put the analyzer in the left tail pipe.

48. When hooking up the combustion analyzer when testing the combustion efficiency on an emission system, the analyzer's probe should be how far in the hook-up?

a. 2".
b. 1/2".
c. 18".
d. 6".

49. When adjusting the mixture screws on the carburetor, you should let the combustion analyzer set for how long? (when taking a combustion efficiency test on an emission system)

a. 5 seconds.
b. not more than 10 seconds.
c. 10 seconds.
d. 3 seconds.

37.06.01.13. cont.

50. In order to take a combustion efficiency check, you must have the engine and analyzer at what temperature?

a. hot operating temperature.
b. cold operating temperature.
c. normal operating temperature.
d. it doesn't make any difference.

UNIT POST TEST ANSWER KEY: FUNDAMENTALS OF EMISSION CONTROL SYSTEMS A

LAP .01

1. b
2. c
3. a
4. d
5. d

LAP .02

6. d
7. c

LAP .03

8. a
9. a
10. a
11. d
12. [illegible]

LAP .04

13. a
14. d
15. c
16. d
17. b

LAP .05

18. [illegible]
19. c
20. [illegible]
21. a
22. [illegible]

LAP .06

23. c
24. d
25. d
26. b
27. a

LAP .07

28. a
29. b
30. c
31. c
32. d

LAP .08

33. a
34. c
35. d
36. b
37. a

LAP .09

38. a
39. [illegible]
40. a

LAP .10

41. b
42. c

LAP .11

43. b
44. [illegible]

LAP .12

45. d

LAP .13

46. a
47. d
48. c
49. c
50. c

Participant: _____ File Code: 37.06.01.00.C1-2 (B)

Date: _____ Date Published: 5/10/77

Mountain-Plains Education & Economic Development Program, Inc.
Glasgow AFB, Montana 59231

UNIT POST TEST: FUNDAMENTALS OF EMISSIONS SYSTEMS (B)

37.06.01.01

1. A poisonous gas which is in exhaust fumes is:

   a. sulfur dioxide
   b. carbon dioxide
   c. hydrogen oxide
   d. carbon monoxide

2. By a more complete burning of the fuel charge you can:

   a. let more carbon monoxide into the atmosphere
   b. damage your engine
   c. shorten the burning action of hydrocarbons
   d. reduce the exhaust emission

3. To avoid upsetting the basic carburetor air-fuel ratios for various operating conditions, it is essential that you have a:

   a. PCV control valve
   b. air pump
   c. oil filter
   d. check valve

4. How many crankcase vent systems are there:

   a. 3
   b. 1
   c. 2
   d. 4

5. Hydrocarbon emission into the atmosphere, when it reacts with sunlight, tends to produce what is called:

   a. exhaust fumes
   b. photochemical smog
   c. PCV deposits
   d. burdon pressure

37.06.01.02

6. A PCV system can be checked by:

   a. checking your vacuum in the carburetor
   b. checking your gas mileage
   c. a special valve tester over the filler caphole
   d. air leaking in your lines if PVC system is bad

37.06.01.02 cont.

7. If crankcase vent valve is of the crimped type, it can:

   a. be taken apart and filter can be cleaned
   b. not be cleaned
   c. not be used again
   d. not be disassembled for service and cleaning

37.06.01.03

8. Ford engineers feel that the location that most effectively mixes exhaust gases and air for effective burning of hydrocarbons is:

   a. the air cleaner
   b. the intake manifold
   c. the air horn on the carburetor
   d. the exhaust port near the exhaust valve seat

9. By retarding the spark on a Ford IMCO unit you can:

   a. reduce emission from the exhaust
   b. increase emission from the exhaust
   c. reduce emission from the intake manifold
   d. increase emission from the intake manifold

10. With a Ford calibrated carburetor it is poor practice to:

   a. increase the richness of the fuel-air mixture
   b. decrease the richness of the fuel-air mixture
   c. lower exhaust emission
   d. impair exhaust backfire

11. The Ford IMCO exhaust emission control system is designed to:

   a. reduce the amount of carbon monoxide and hydrocarbons formed in the engine
   b. reduce the amount of heptane and isooctane formed in the engine
   c. reduce the amount of distillation in an engine
   d. reduce the volatility of the fuel

37.06.01.04

12. The Ford Delay Vacuum Bypass System (DVB) is designed under varying ambient temperatures and vehicle speed to:

   a. delay gas flow into the carburetor
   b. delay distributor vacuum advance
   c. advances distributor vacuum
   d. produce a limited amount of gas flow.

37.06.01.04 cont.

13. In the Ford Exhaust Gas Recirculation system, the mixture of exhaust gases is diluted thus lowering peak flame temperatures during combustion and limiting the formation of:

    a. warm air entering the carburetor
    b. advanced spark
    c. gas circulation or flow
    d. nitrogen oxides (NOx)

14. On the Ford Electronic Distributor Modulator, when the speed is below 23 mph on acceleration, it operates to:

    a. draw air from outside of car only
    b. advance spark
    c. prevent spark advance
    d. draw air from the exhaust manifold only

15. Some Ford Emission systems incorporate a vacuum override motor which has the function of providing additional air to the carburetor during:

    a. cold decelerations
    b. hot acceleration
    c. hot deceleration
    d. cold acceleration

16. On an Auto Therm Air Cleaner System, when you first start your engine, air is drawn from:

    a. the shroud at the exhaust manifold
    b. the engine compartment
    c. outside of the car
    d. the intake manifold

36.06.01.05

17. On a dual exhaust on a Chrysler engine when checking the air-fuel ratio, you would insert exhaust sample pick-up tube where?

    a. left tail pipe
    b. right tail pipe
    c. both tail pipes
    d. on the exhaust manifold

18. The Chrysler system is mainly designed to most effectively cut down emission exhaust during:

    a. speed of 30 to 60
    b. acceleration
    c. deceleration
    d. speeds of 60 to 80

37.06.01.06

19. The distributor solenoid, in a Chrysler, retards the ignition timing to reduce emission during:

    a. hot idle conditions
    b. cold idle conditions
    c. normal operating conditions
    d. cold operating conditions

20. The NOx system, in a Chrysler, controls nitrous oxides emissions by allowing vacuum spark advance only in what conditions?

    a. low gear
    b. high gear
    c. speeds below 30 mph.
    d. speeds below 15 mph.

21. The Chrysler Orifice Spark Advance control is used in the control of oxides of nitrogen. The system controls the:

    a. compression of the pistons
    b. vacuum advance to the distributor instantaneously
    c. temperature of the coolant system
    d. vacuum advance activator of the distributor

22. In the Chrysler Exhaust Gas Recirculation System (EGR), exhaust gases are circulated to:

    a. retard the vacuum advance system
    b. warm up the engine exhaust system
    c. activate the vacuum advance system
    d. dilute the incoming fuel-air mixture

23. In the Chrysler air injection emission system, fresh air is pumped into the exhaust valves to:

    a. insure a steady amount of clean air to distributor
    b. increase engine horsepower
    c. burn the unburned portion of exhaust gases
    d. prevent flooding when starting

37.06.01.07

24. On the General Motors emission system the thermostatically controlled air cleaner is designed to keep the air entering the carburetor at approximately:

    a. 500 degrees
    b. 1,500 degrees
    c. 2,000 degrees
    d. 100 degrees

37.06.01.07 cont.

25. The valves in a General Motors emission system which are located on air manifolds to prevent back flow of exhaust gases into air injection lines are called the:

    a. exhaust valves
    b. pressure relief valves
    c. check valves
    d. diverter valves

26. On a General Motors emission system, a valve is located in the discharge cavity of the air pump or in the diverter valve. Its function allows pumping outlet air to bypass air injection system at high engine speeds and loads; this valve is called:

    a. diverter valve
    b. check valve
    c. pressure relief valve
    d. exhaust valve

27. On a General Motors emission system, the tubes leading to each cylinder exhaust port are made of:

    a. aluminum
    b. stainless steel
    c. cast iron
    d. pewter

28. General Motors emission systems have a:

    a. controlled combustion system
    b. thermactor system
    c. air guard system
    d. engine mod system

37.06.01.08

29. The thermostatically controlled air cleaner, in the GM Controlled Combustion System, is designed to keep the air entering the carburetor at approximately what temperature?

    a. 100 degrees F
    b. 85 degrees F
    c. 65 degrees F
    d. 120 degrees F

30. What is the purpose of the pressure control valve placed between the valve cover and the manifold in the crank case ventilating system?

    a. to provide extra air for idling
    b. to prevent excess air flow during idling
    c. to retard the spark
    d. to decrease air flow when engine speed increases.

37.06.01.08 cont.

31. On a General Motors Exhaust Gas Recirculation system (EGR), the exhaust gases are induced into the:

    a. distributor vacuum diaphragm
    b. exhaust manifold
    c. carburetor during normal operating speeds
    d. intake manifold at throttle positions other than idle

32. To test the GM (S.C.S.) system you raise the rear wheels, start the engine and accelerate it while watching the timing marks on the harmonic balancer. When the car speed exceeds 38 mph, the timing should:

    a. stay the same
    b. retard 10 degrees
    c. advance
    d. retard not more than 5 degrees

33. In the General Motors (S.C.S.) system, the vacuum spark advance is controlled by:

    a. the vehicle's speed
    b. high gear operation
    c. low gear operation
    d. high gear deceleration

37.06.01.09

34. When you install a new centrifugal filter fan, you do so by:

    a. drawing evenly by alternating torquing pulley bolts
    b. tapping it on evenly using a hammer
    c. pressing it on with a jack
    d. heating the filter fan so it will slip over the rotor shaft

35. The exhaust emission air pump is activated by:

    a. the V-belt
    b. the cam shaft
    c. the crank shaft
    d. the pistons

37.06.01.10

36. How do injection tubes fit into the exhaust manifold?

    a. pressed in
    b. by threads
    c. slip in
    d. tapped in

37.06.01.10 cont.

37. When do you inspect air-injection tubes?

a. periodic checks of six months
b. whenever the cylinder head or exhaust manifolds are removed
c. periodic checks of once a year
d. periodic checks of four months

37.06.01.11

38. Check valves in an emission system should be checked when?

a. whenever there are no exhaust gases in the air pump
b. whenever the hose from the check valve is disconnected
c. periodic checks of every six months
d. periodic checks of every four months

37.06.01.12

39. To check the anti-afterburn valve you disconnect the valve inlet hose from valve and race the engine rapidly. The moment accelerator is released, air should be sucked into valve. How long can air be sucked into the valve before it should be replaced?

a. 2 seconds
b. 10 seconds
c. 20 seconds
d. 5 seconds

37.06.01.13

40. In order to take a combustion efficiency check, you must have the engine and analyzer at what temperature?

a. hot operating temperature
b. cold operating temperature
c. normal operating temperature
d. it doesn't make any difference

41. When adjusting the mixture screws on the carburetor, you should let the combustion analyzer set for how long? (When taking a combustion efficiency test on an emission system)

a. 5 seconds
b. not more than 10 seconds
c. 10 seconds
d. 3 seconds

42. When hooking up the combustion analyzer when testing the combustion efficiency on an emission system, the analyzer's probe should be how far in the hook-up?

a. 2"
b. 1/2"
c. 18"
d. 6"

37.06.01.13 cont.

43. When you have a dual exhaust and are checking the combustion efficiency on an emission system, it is important to:

    a. disconnect the vacuum advance on the carburetor
    b. put the analyzer in both tail pipes
    c. plug one tail pipe when hooking the analyzer to the exhaust manifold
    d. put the analyzer in the left tail pipe

44. When testing combustion efficiency in an emission system, you would hook your analyzer:

    a. in the exhaust pipe
    b. in the exhaust manifold
    c. in the intake manifold
    d. in the fuel outlet on the carburetor

UNIT POST TEST ANSWER KEY: FUNDAMENTALS OF EMISSIONS SYSTEMS (B)

1. D
2. D
3. A
4. C
5. B
6. C
7. D
8. D
9. A
10. A
11. A
12. B
13. D
14. C
15. D
16. A
17. A
18. C
19. A
20. B
21. D
22. D
23. C
24. D
25. C
26. C
27. B
28. A
29. A
30. B
31. D
32. C
33. A
34. A
35. A
36. C
37. B
38. B
39. D
40. C
41. C
42. C
43. D
44. A

Student: _____ File Code: 37.06.01.00.C1-2 (C)

Date: _____ Date Published: May 11, 1977

UNIT POST TEST: FUNDAMENTALS OF EMISSIONS SYSTEMS (C)

37.06.01.01

1. By a more complete burning of the fuel charge you can:

   a. let more carbon monoxide into the atmosphere
   b. damage your engine
   c. shorten the burning action of hydrocarbons
   d. reduce the exhaust emission

2. Hydrocarbon emission into the atmosphere, when it reacts with sunlight, tends to produce what is called:

   a. exhaust fumes
   b. photochemical smog
   c. PCV deposits
   d. burdon pressure

3. To avoid upsetting the basic carburetor air-fuel ratios for various operating conditions, it is essential that you have a:

   a. PCV control valve
   b. air pump
   c. oil filter
   d. check valve

4. A poisonous gas which is in exhaust fumes is:

   a. sulfur dioxide
   b. carbon dioxide
   c. hydrogen oxide
   d. carbon monoxide

5. How many crankcase vent systems are there:

   a. 3
   b. 1
   c. 2
   d. 4

37.06.01.02

6. If crank case vent valve is of the crimped type, it can:

   a. be taken apart and filter can be cleaned
   b. not be cleaned
   c. not be used again
   d. not be disassembled for service and cleaning

37.06.01.02 cont.

7. A PVC system can be checked by:

   a. checking your vacuum in the carburetor
   b. checking your gas mileage
   c. a special valve tester over the filler caphole
   d. air leaking in your lines if PCV system is bad

37.06.01.03

8. The Ford IMCO exhaust emission control system is designed to:

   a. reduce the amount of carbon monoxide and hydrocarbons formed in the engine
   b. reduce the amount of heptane and isooctane formed in the engine
   c. reduce the amount of distillation in an engine
   d. reduce the volatility of the fuel

9. Ford engineers feel that the location that most effectively mixes exhaust gases and air for effective burning of hydrocarbons is:

   a. the air cleaner
   b. the intake manifold
   c. the air horn on the carburetor
   d. the exhaust port near the exhaust valve seat.

10. By retarding the spark on a Ford IMCO unit you can:

   a. reduce emission from the exhaust
   b. increase emission from the exhaust
   c. reduce emission from the intake manifold
   d. increase emission from the intake manifold

11. With a Ford calibrated carburetor it is poor practice to:

   a. increase the richness of the fuel-air mixture
   b. decrease the richness of the fuel-air mixture
   c. lower exhaust emission
   d. impair exhaust backfire

37.06.01.04

12. Some Ford Emission systems incorporate a vacuum override motor which has the function of providing additional air to the carburetor during:

   a. cold decelerations
   b. hot accelerations
   c. hot decelerations
   d. cold accelerations

37.06.01.04 cont.

13. The Ford Delay Vacuum Bypass System (DVB) is designed under varying ambient temperatures and vehicle speeds to:

    a. delay gas flow into the carburetor
    b. delay distributor vacuum advance
    c. advances distributor vacuum
    d. produce a limited amount of gas flow

14. On the Ford Electronic Distributor Modulator, when the speed is below 23 mph on acceleration, it operates to:

    a. draw air from outside of car only
    b. advance spark
    c. prevent spark advance
    d. draw air from the exhaust manifold only

15. On an Auto Therm Air Cleaner System, when you first start your engine air is drawn from:

    a. the shroud at the exhaust manifold
    b. the engine compartment
    c. outside of the car
    d. the intake manifold

16. In the Ford Exhaust Gas Recirculation system, the mixture of exhaust gases is diluted thus lowering peak flame temperatures during combustion and limiting the formation of:

    a. warm air entering the carburetor
    b. advanced spark
    c. gas circulation or flow
    d. nitrogen oxides (NOx)

37.06.01.05

17. The Chrysler system is mainly designed to most effectively cut down emission exhaust during:

    a. speeds of 30 to 60
    b. acceleration
    c. deceleration
    d. speeds of 60 to 80

18. On a dual exhaust on a Chrysler engine when checking the air-fuel ratio, you would insert exhaust sample pick-up tube where?

    a. left tail pipe
    b. right tail pipe
    c. both tail pipes
    d. on the exhaust manifold

37.06.01.06

19. In the Chrysler air injection emission system, fresh air is pumped into the exhaust valves to:

    a. insure a steady amount of clean air to distributor
    b. increase engine horsepower
    c. burn the unburned portion of exhaust gases
    d. prevent flooding when starting

20. The NOx system, in a Chrysler, controls nitrous oxides emissions by allowing vacuum spark advance only in what conditions?

    a. low gear
    b. high gear
    c. speeds below 30 mph
    d. speeds below 15 mph

21. The distributor solenoid, in a Chrysler, retards the ignition timing to reduce emission during:

    a. hot idle conditions
    b. cold idle conditions
    c. normal operating conditions
    d. cold operating conditions

22. In the Chrysler Exhaust Gas Recirculation System (EGR), exhaust gases are circulated to:

    a. retard the vacuum advance system
    b. warm up the engine exhaust system
    c. activate the vacuum advance system
    d. dilute the incoming fuel-air mixture

23. The Chrysler Orifice Spark Advance control is used in the control of oxides of nitrogen. The system controls the:

    a. compression of the pistons
    b. vacuum advance to the distributor instantaneously
    c. temperature of the coolant system
    d. vacuum advance activator of the distributor

37.06.01.07

24. General Motors emission systems have a:

    a. controlled combustion system
    b. thermactor system
    c. air guard system
    d. engine mod system

25. On a General Motors emission system, a valve is located in the discharge cavity of the air pump or in the dirverter valve. Its function allows pumping outlet air to bypass air injection system at high engine speeds and loads; this valve is called:

    a. diverter valve
    b. check valve
    c. pressure relief valve
    d. exhaust valve

37.06.01.07

26. On the General Motors emission system the thermostatically controlled air cleaner is designed to keep the air entering the carburetor at approximately:

a. 500 degrees
b. 1,500 degrees
c. 2,000 degrees
d. 100 degrees

27. The valves in a General Motors emission system which are located on air manifolds to prevent back flow of exhaust gases into air injection lines are called the:

a. exhaust valves
b. pressure relief valves
c. check valves
d. diverter valves

28. On a General Motors emission system, the tubes leading to each cylinder exhaust port are made of:

a. aluminum
b. stainless steel
c. cast iron
d. pewter

37.06.01.08

29. In the General Motors (S.C.S.) System, the vacuum spark advance is controlled by:

a. the vehicle's speed
b. high gear operation
c. low gear operation
d. high gear deceleration

30. The thermostatically controlled air cleaner, in the GM Controlled Combustion System, is designed to keep the air entering the carburetor at approximatley what temperature?

a. 100 degrees F
b. 85 degrees F
c. 65 degrees F
d. 120 degrees F

31. What is the purpose of the pressure control valve placed between the valve cover and the manifold in the crank case ventilating system?

a. to provide extra air for idling
b. to prevent excess air flow during idling
c. to retard the spark
d. to decrease air flow when engine speed increases

37.06.01.08 cont.

32. To test the GM (S.C.S.) system you raise the rear wheels, start the engine and accelerate it while watching the timing marks on the harmonic balancer. When the car speed exceeds 38 mph, the timing should:

    a. stay the same
    b. retard 10 degrees
    c. advance
    d. retard not more than 5 degrees

33. On a general Motors Exhaust Gas Recirculation system (EGR), the exhaust gases are induced into the:

    a. distributor vacuum diaphragm
    b. exhaust manifold
    c. carburetor during normal operating speeds
    d. intake manifold at throttle positions other than idle

37.06.01.09

34. The exhaust emission air pump is activated by:

    a. the V-belt
    b. the cam shaft
    c. the crank shaft
    d. the pistons

35. When you install a new centrifugal filter fan, you do so by:

    a. drawing evenly by alternating torquing pulley bolts
    b. tapping it on evenly using a hammer
    c. pressing it on with a jack
    d. heating the filter fan so it will slip over the rotor shaft

37.06.01.10

36. When do you inspect air-injection tubes?

    a. periodic checks of six months
    b. whenever the cylinder head or exhaust manifolds are removed
    c. periodic checks of once a year
    d. periodic checks of four months

37. How do injection tubes fit into the exhaust manifold?

    a. pressed in
    b. by threads
    c. slip in
    d. tapped in

37.06.01.11

38. Check valves in an emission system should be checked when?

    a. whenever there are no exhaust gases in the air pump
    b. whenever the hose from the check valve is disconnected
    c. periodic checks of every six months
    d. periodic checks of every four months

37.06.01.12

39. To check the anti-afterburn valve you disconnect the valve inlet hose from valve and race the engine rapidly. The moment accelerator is released, air should be sucked into valve. How long can air be sucked into the valve before it should be replaced?

    a. 2 seconds
    b. 10 seconds
    c. 20 seconds
    d. 5 seconds

37.06.01.13

40. When you have a dual exhaust and are checking the combustion efficiency on an emission system, it is important to:

    a. disconnect the vacuum advance on the carburetor
    b. put the analyzer in both tail pipes
    c. plug one tail pipe when hooking the analyzer to the exhaust manifold
    d. put the analyzer in the left tail pipe

41. In order to take a combustion efficiency check, you must have the engine and analyzer at what temperature?

    a. hot operating temperature
    b. cold operating temperature
    c. normal operating temperature
    d. it doesn't make any difference

42. When adjusting the mixture screws on the carburetor, you should let the combustion analyzer set for how long? (When taking a combustion efficiency test on an emission system)

    a. 5 seconds
    b. not more than 10 seconds
    c. 10 seconds
    d. 3 seconds

43. When testing combustion efficiency in an emission system, you would hook your analyzer:

    a. in the exhaust pipe
    b. in the exhaust manifold
    c. in the intake manifold
    d. in the fuel outlet on the carburetor.

37.06.01.13 cont.

44. When hooking up the combustion analyzer when testing the combustion efficiency on an emission system, the analyzer's probe should be how far in the hook-up?

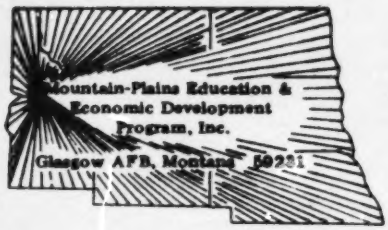
a. 2"
b. 1/2"
c. 18"
d. 6"

UNIT POST TEST ANSWER KEY: FUNDAMENTALS OF EMISSIONS SYSTEMS (C)

1. D
2. B
3. A
4. D
5. C
6. D
7. C
8. A
9. D
10. A
11. A
12. D
13. B
14. C
15. A
16. D
17. C
18. A
19. C
20. B
21. A
22. D
23. D
24. A
25. C
26. D
27. C
28. B
29. A
30. A
31. B
32. C
33. D
34. A
35. A
36. B
37. C
38. B
39. D
40. D
41. C
42. C
43. A'
44. C

Student: _____ File Code: 37.06.01.00.B1-5

Date: _____ Date Published: 3/8/76



Family Pay Number: _____ Sex: M F (Circle 1)

UNIT PERFORMANCE TEST: SERVICE EMISSION SYSTEMS

OBJECTIVE:

Service Emission System.

TASK:

The student will be assigned a vehicle on which he must service the emission system components.

ASSIGNMENT:

CONDITIONS:

The student may use only those materials provided for the test.

RESOURCES:

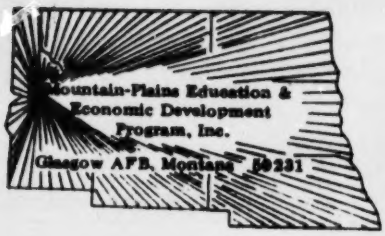
Service Manual
Parts and time manual
Fender covers
Vacuum gauges
"Sun" tester
Auto with emission system

RESOURCES (Continued):

Combination Ignition wrench set
Combination Wrench Set
Standard Screwdriver Set
Phillips Screwdriver Set
Feeler gauge - .002 through .025 inch
Hex Key Set
Diagonal Cutting Pliers
Needle Nose Plier
1/4" Drive Socket Set
Ratchet - 3" and 6" extensions - 6" flex handle
Ball Peen hammer
Plastic Tip Hammer
Screw Starter
Chisel and Punch Set
5/32" Pin Punch - 3/16" Solid
Gasket scraper
3/8" Drive Ratchet
3" Extension
Spark Plug Socket
6" Extension
Speed Handle
3/8" Drive Socket Set

Student: _____ File Code: 37.06.01.00.B1-5

Date: _____ Date Published: 3/8/76



Family Pay Number: _____ Sex: M F (Circle 1)

PERFORMANCE CHECKLIST:

OVERALL PERFORMANCE: Satisfactory_____ Unsatisfactory_____

	CRITERION Met	Not Met
Objective:		
1. Test emission system for pollution levels.		
Criterion: Compares to manufacturer's specifications.		
2. Service emission system.		
Criterion: Follows manufacturer's procedures and adjusts to		
specifications.		
3. Tests emission system after service for pollution levels.		
Criterion: Must meet manufacturer's specifications.		
4. Completes test in allotted time.		
Criterion: Meets flat rate time on assigned vehicle.		
Student must satisfactorily complete three of four line items		
to pass test.		